

A New Species of *Dioscorea* from Costa Rica

Barry E. Hammel

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166 U.S.A.

ABSTRACT. *Dioscorea natalia* (Dioscoreaceae) is described from wet to very wet areas on both Pacific and Caribbean slopes of Costa Rica, from the Monteverde area to Tapantí National Park. The species' confusion with the related *D. lepida* C. V. Morton is discussed, and a key is provided to distinguish it from that species and the other two closely related Costa Rican species, *D. racemosa* (Klotzsch) Uline and *D. standleyi* C. V. Morton.

During the course of work on a treatment of *Dioscorea* for the *Manual de Plantas de Costa Rica*, material of three possible new species was set aside for further study. Careful examination and review demonstrated that one of them would not be separated from the recently described Panamanian *D. davidsei* O. Téllez, and that the other corresponds to *D. lepida*. The third, here described as *D. natalia*, had previously been identified as *D. lepida* and with that species, is closely related to two other Costa Rican species, *D. racemosa* and *D. standleyi*.

Dioscorea natalia Hammel, sp. nov. TYPE: Costa Rica. Cartago: Parque Nacional Tapantí, Sendero Oropendula, 1400 m, 26 Sep. 1997 (stam. & pist. fl, fr), *B. Hammel & S. Troyo 21068* (holotype, INB; isotypes, CR, F, MEXU, MO). Figure 1.

Species subtilis *D. racemosae* affinis, a qua imprimis differt inflorescentiis brevioribus, paucior-floribus rachidibus exilioribus.

Stems delicate, twisting to the right but also very rarely to the left. Leaves alternate, ovate to narrowly triangular-cordate, 4.5–6(–9.5) × 2.5–3.5(–5) cm, 7(9)-nerved, glabrous, very faintly glandular-dotted on the lower surface. Staminate inflorescences 4–8(–10) cm, simple racemes to racemose, usually 1 to rarely as many as 5 per axil; the rachis ± verruculose, very delicate, up to only twice the diameter of the pedicels; the cymes of 1 (rarely 2) flowers, subtended by a pair of narrowly triangular bracts 1–1.5 mm; pedicels 1.5–2(–4) mm. Staminate flowers with tepals appearing nearly valvate in bud, broadly triangular, 0.8–1.1 mm, patent, pale yellowish green or cream; stamens 3, connivent in the center of a ± hexagonal torus; filaments ca.

0.1–0.15 mm, united only at the very base; anther cells ± ovoid, ca. 0.15–0.2 mm, touching those of adjacent anthers, dehiscing upward; staminodia none. Pistillate inflorescences 5–8 cm, spikes. Pistillate flowers with tepals as in the staminate ones but to 1.25 mm; styles 3, united in a conical stylar column 0–0.25 mm, the free portion, including stigmas, ca. 0.4 mm; stigmas 3, simple; staminodia lacking. Fruits perpendicular to the rachis, elliptic, 1.2–2.0 × 0.5–0.9 cm, apically acute; seeds 1–1.4 × 0.3–0.4 cm, winged on the posterior end.

Paratypes. COSTA RICA. **Alajuela:** Reserva Forestal San Ramón, 1100 m, Apr. 1991 (fl), *Bittner 972* (CR); between San Miguel and La Palma de San Ramón, Nov. 1926, *Brenes (278) 5124* (CR); Monteverde Reserve, Río Peñas Blancas, 900 m, Aug. 1988 (fl), *Bello 248* (CR). **Guanacaste:** Monteverde, 1 km al N de Las Nubes, 1300 m, Sep. 1988 (stam., pist. fl, fr), *Haber & Zuchowski 8675* (INB, MO); road to Las Nubes, 1400 m, Nov. 1988 (stam., pist. fl), *Haber 8749* (INB). **Puntarenas:** Monteverde Reserve, 1 km SW of Station, 1500 m, Feb. 1992 (fl), *Ingram & Ferrell 1298* (CR); Monteverde vicinity, Upper Río Negro valley, 1500 m, Sep. 1985 (fl, fr), *Haber ex Bello 3020* (CR); Monteverde vicinity, San Gerardo Biological Station, 1200 m, Feb. 1995 (pist. fl, fr), *Penneys 167* (CR, F, INB, MO, US). **San Jose:** Río Hondura, 1100 m, Feb. 1974 (fl), *Lent 3791* (CR). **Cartago:** Cañón del Río Grande de Orosí, Oct. 1983 (fl, fr), *Chacón et al. 1483* (CR—6 mounted duplicates); Parque (Refugio) Nacional Tapantí, 1250 m, Aug. 1991 (stam. fl), *Hammel et al. 18324* (INB, MO); 1400 m, Dec. 1992 (fl), *Herrera 5813* (CR), June 1994 (stam. fl), *Morales & Carnevali 2873* (INB); Valle del Reventazón, Moravia de Chirripó, 1100 m, Sep. 1993 (stam. fl), *Campos & Campos 186* (INB).

Distribution. This species, apparently endemic to Costa Rica, is known from some of the very wettest parts of the country, especially P. N. Tapantí. However, it is also known from the Las Nubes area of Monteverde, which is relatively dry. So far it is known only from 900–1500 m, from Monteverde and Tapantí, and several intervening localities.

Etymology. It was my pleasure to defer to Silvia Troyo, illustrator of this new species, the honor of choosing its name. When she came across the species for the first time in the field, she was struck by the same joy of discovery as any taxonomist upon finding such a new species, so tiny and precious. For all good reason, she chose the name *Natalia*, one often given here to first-born daughters, and that of her own. The epithet “natalia” is used

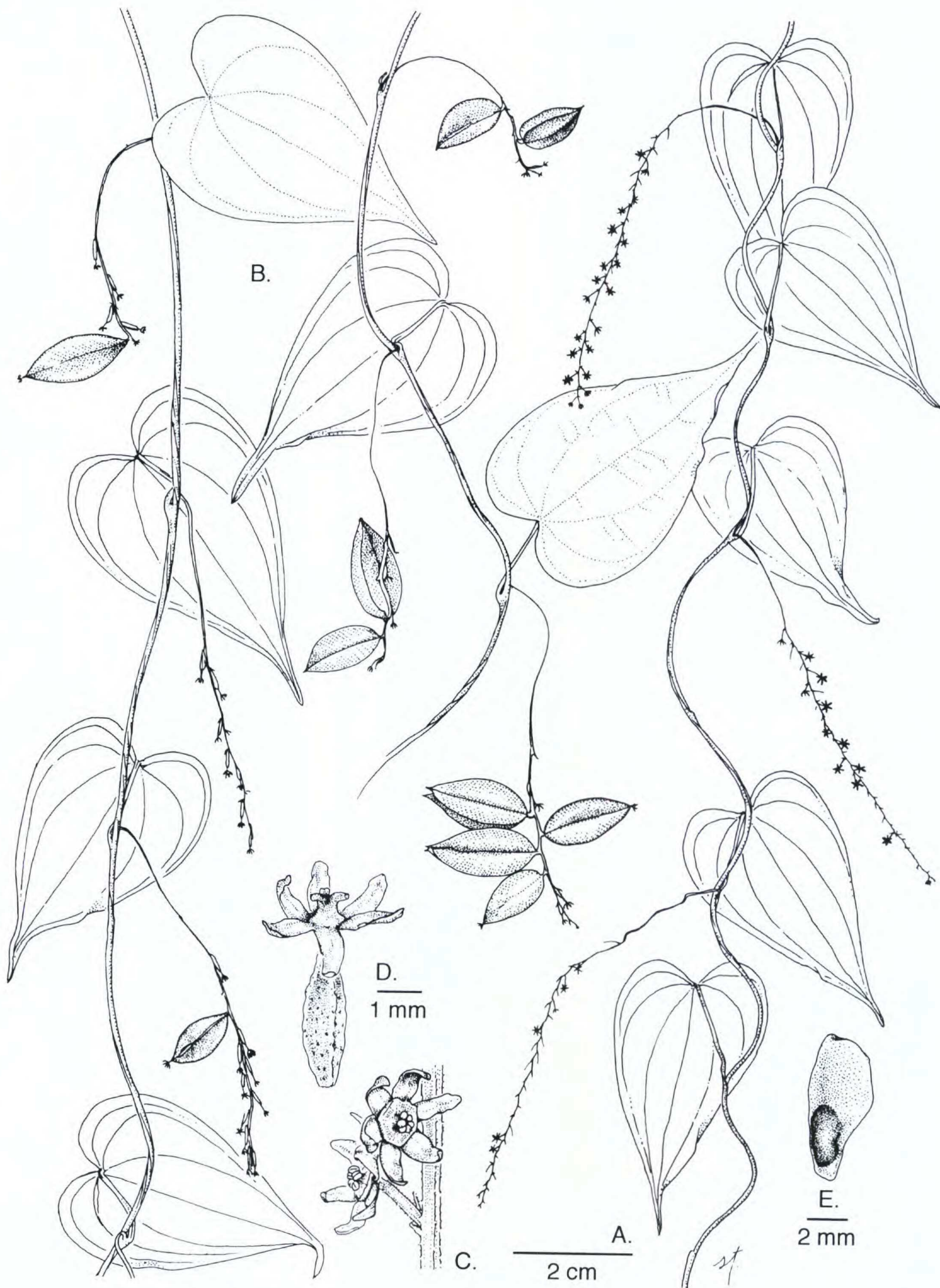


Figure 1. *Dioscorea natalia* Hammel. —A. Habit, staminate branch. —B. Habit, pistillate branches. —C. Staminate flowers. —D. Pistillate flower. —E. Seed. Drawn from the type specimen.

intentionally as a word in apposition with no Latin termination as sanctioned by the Saint Louis Code, Article 23.1 (Greuter et al., 2000), and therefore not to be corrected (Art. 60.11) by well-meaning Latinists.

Discussion. *Dioscorea natalia* is distinct from the closely related Costa Rican species (*D. lepida*, *D. racemosa*, *D. standleyi*) by its consistently very small leaves and small, delicate inflorescences whose slender rachis is usually less than twice the diameter of the pedicels. The flowers are almost always solitary along the rachis, and are borne on rather long pedicels up to 4 mm. Some specimens of *D. racemosa* have nearly identical, also solitary flowers. However, the leaves are much larger, the inflorescences longer and thicker, and the flowers are more densely clustered. Although specimens of this species, examined for *Flora Mesoamericana*, were originally identified as *D. lepida*, the two are easy to distinguish: *D. lepida* always has much larger leaves, much-branched staminate inflorescences, and more or less ligulate, rather than broadly triangular, tepals.

Since *D. natalia* had originally been determined as *D. lepida*, a discussion concerning our understanding of the latter is in order. Partly because the original description was based only on fruiting material (Morton, 1936), *D. lepida* has often been wrongly identified and poorly characterized (cf. Morton, 1945; Standley, 1937). Early in my study of the Costa Rican *Dioscorea* I had considered this material to be a new species distinct from related species by virtue of its abundantly branched staminate inflorescences, and very broadly cordate, many-veined, and often opposite leaves. None of these features was mentioned in the original description of *D. lepida*, nor used to distinguish it in intervening floristic treatments. The one feature, visible in the type, that taxonomists have used to form an (erroneous) concept of this species is the apically acute fruits (cf. Téllez & Schubert, 1994). It is now known that material grouped by that character alone can include several species: *D. lepida*, *D. natalia*, *D. racemosa*, and *D. standleyi* all have rather small, often or always apically acute fruits. If one additional character should be chosen as that which allowed a clear delimitation of *D. lepida*, it would be the position of the mature fruits, i.e., reflexed (see key) by the pedicels toward the base of the infructescence so that they lie nearly parallel to the rachis. This is consistent in all fruiting collections and all observed populations of *D. lepida*, and contrasts with the more or less perpendicular or even apically directed fruits of the related species here discussed. That, in conjunction with the

narrowly acute fruits, much-branched staminate inflorescences, broad, many-veined, and often opposite or even ternate leaves (at lower nodes), as well as the rather high and narrow elevational range, help distinguish *D. lepida* from its close relatives in Costa Rica.

In addition, *D. lepida* is unusual in that plants of all populations examined were monoecious instead of dioecious, as most species of *Dioscorea* are considered to be. *Dioscorea lepida* stems apparently die back during the dry season, and the new shoots, appearing at the beginning of the rainy season, flower precociously with staminate flowers. As the stems elongate they begin producing pistillate flowers toward the apex with a few intermediate inflorescences bearing both sexes and even some apparently hermaphroditic flowers. By the time the plants are in late flowering stage or fruiting, there may be little or no evidence of the staminate inflorescences lower down. Such a situation can easily give rise to herbarium specimens that bear only one sex. Field or greenhouse observations of other species known only from collections might demonstrate monoecy to be more widespread in *Dioscorea* than previously thought.

KEY TO COSTA RICAN SPECIES CLOSELY RELATED TO *D. NATALIA*

The terminology used here, reflexed (downturned) versus upturned, relative to the axil, would be reversed relative to gravity since the infructescences are pendent in living plants.

- 1a. Staminate inflorescences paniculate (primary inflorescence axis branched), the branches racemes of flowers in cymose clusters; leaves usually opposite, sometimes alternate, rarely ternate at lower nodes, (9–)11–13(–15)-veined; plants monoecious; fruit pedicels strongly reflexed; stylar column ca. 0.4–0.5 mm long *D. lepida*
- 1b. Staminate inflorescences racemose (primary inflorescence axis unbranched), the flowers solitary along the rachis or in cymose clusters; leaves alternate, 7–9-veined; plants typically dioecious; fruit pedicels mostly perpendicular to the axis, upturned, or occasionally slightly reflexed; stylar column mostly much longer or shorter than 0.4–0.5 mm.
 - 2a. Filament column ca. 0.7 mm, the filaments apically (above the center) curved outward, the anthers separate; tepals ligulate; staminate flowers in cymose clusters; stylar column 0.8–1.1 mm *D. standleyi*
 - 2b. Filament column mostly < 0.25 mm, usually erect and the anthers connivent, occasionally separate; tepals mostly broadly triangular, rarely ligulate; staminate flowers often solitary; stylar column mostly 0–0.25 mm (rarely up to 0.5 mm in *D. racemosa*).
 - 3a. Staminate inflorescences 4–8(–10) cm, solitary, the rachis slender, mostly less

than twice the diameter of the pedicels, sparsely flowered, the flowers solitary, pale green; leaves mostly 4.5–6 × 2.5–3.5 cm; infructescence with < 10 fruits; plants delicate *D. natalia*

- 3b. Staminate inflorescences 9–32 cm, often several per axil, the rachis thick, ca. 4 times the diameter of the pedicels, densely flowered, the flowers often in cymose clusters, usually purple; leaves (7–)10–13(–23) × 4–9(–16) cm; infructescence often with > 20 fruits; plants usually robust *D. racemosa*

Acknowledgments. This work was supported, in part, by funds from the National Science Foundation through a grant (DEB-9300814) to the author and co-PI M. H. Grayum for the Manual to the Plants of Costa Rica. I thank Osvaldo Téllez for his useful comments on an early draft of the manuscript and Sylvia Troyo for her excellent line drawings of the new species.

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